

A Naval Safety Center Publication

approach

MAY 1974 THE NAVAL AVIATION SAFETY REVIEW





By CDR Allen L. Kruger
CO, HS-5

During my 17 years of helicopter flying, I have witnessed almost every type of hairy-helo episode — and more. Too often the helo is looked upon as a highly utilitarian toy capable of performing any feat. Also, many senior officers do not understand the vast differences between models. In preparing this article, I had a long discussion with the Air Boss concerning the reasons why a pilot flying a heavy SH-3D wouldn't land aboard under the same wind conditions a pilot of a lighter SH-3G would.

First of all, I want to say this is not a rebuttal to "25 Years and Still Holding" (NOV '73 APPROACH). This article is to point out how-to-succeed in the new CV environment.

Close liaison began when the squadron first went aboard USS INDEPENDENCE during sea trials. The CO, Air Ops, CAG, and Air Boss were consulted on each and every problem, both orally and in writing. Another factor which kept us in focus was the CO flying in our helicopters to see for himself the reasons "for all that knob twisting and control checking prior to engagement." After just two flights, he became a believer in our rigid standards and attained a real appreciation for the complexities inherent in helos and the variety of missions we fly.

It wasn't a bed of roses to begin with. Many times I climbed those ladders to Pri-Fly and the bridge to back up one of my aircraft commanders. Most problems were solved on the spot by giving details to the gent running the operation. The most important factor to our progress was developing team spirit early to ensure the squadron functioned well under the duality of a strike/ASW mission environment.

One aspect of safe helo operations often overlooked by the Air Boss is that there are parameters which only the HAC can see and feel. For example, the Air Boss sees the wind direction and velocity in the tower as being within limits; yet, the HAC in his aircraft, on spot one, sees his airspeed indicator gusting out of limits and his blades bouncing up and down.

There are other aspects as well, and the Air Boss must be willing on occasion to accept the word of the expert. What is done to satisfy both the Air Boss and the pilot depends to a large degree on education and understanding. For us, it's . . .

One Year

OUR squadron has spent 12 months aboard a new environment: CVA turned CV. The growing pains and experiences encountered are similar to those of other squadrons injected into a new mission profile. Consequently, there have been many lessons learned for both ship and squadron.

In the past, this squadron was accustomed to a CVS with its associated steady operating schedules and its weeks of around-the-clock, all-weather operations. There, we were members of a tight-knit Air Group where fixed-wing and helicopter pilots worked together in coordinated operations.

For the CV, her past had been steeped in the traditional role of Attack Carrier. She was accustomed to hard and fast jet, fixed-wing restraints with little reason for concern for the ship's company detachment of helicopters assigned from time to time.

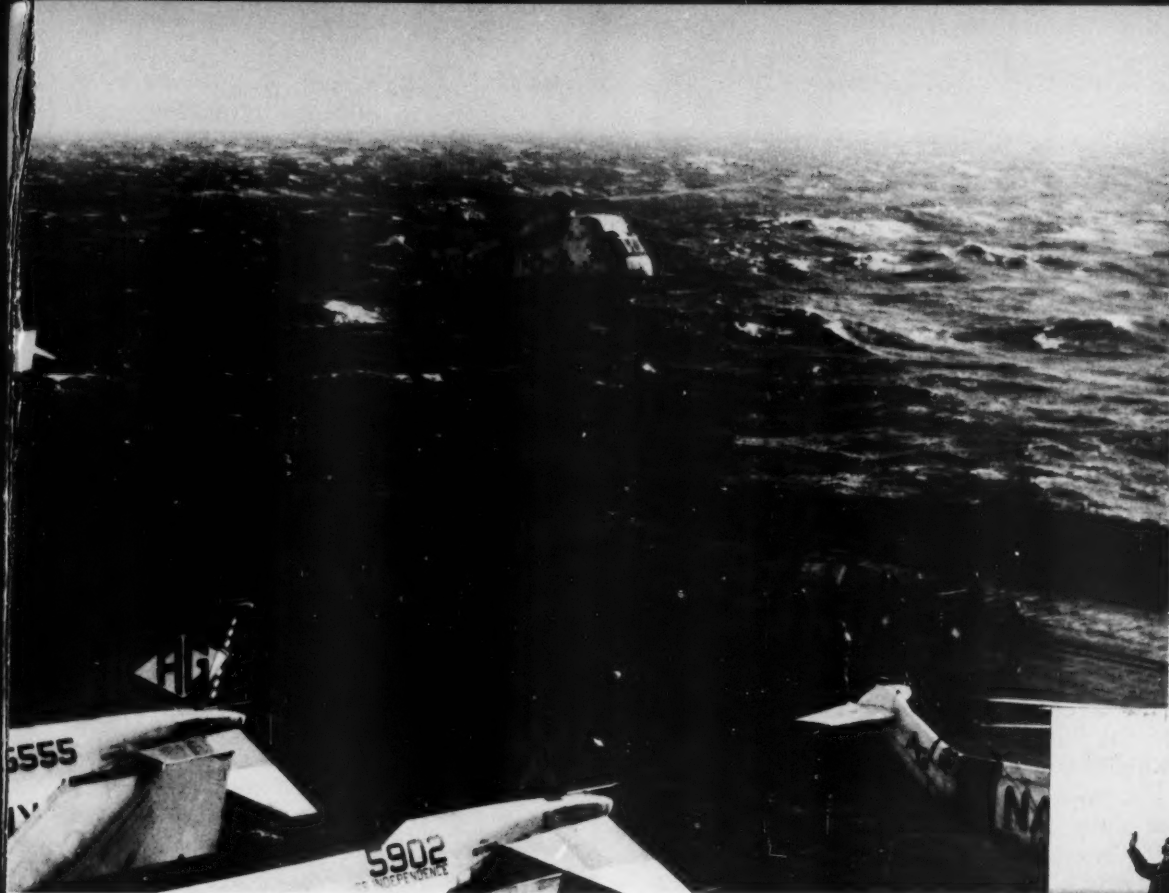
She evolved from that environment where helicopter crews were not equal members of the Air Wing, and

where combined fixed-wing helicopter operations had never been seen before.

The embarked helo detachments were quite small in manpower, having only a few aircraft, and were assigned with a comparatively junior officer-in-charge. This resulted in a definite lack of clout for the small unit which usually was assigned directly to the Air Officer or CATCC. What the Air Boss gave was usually all you got.

The role of the helicopter in this environment was simplistic in nature: SAR, utility, and rescue. It launched, hovered in plane guard, ran utility missions, and was generally handled in an acceptable manner only when it happened to coincide with the normal fixed-wing deck evolutions. Emphasis was quite naturally placed on the higher value jet aircraft which represented the main battery of the CVA weapon system.

In short, the utility detachment was an add-on. It had



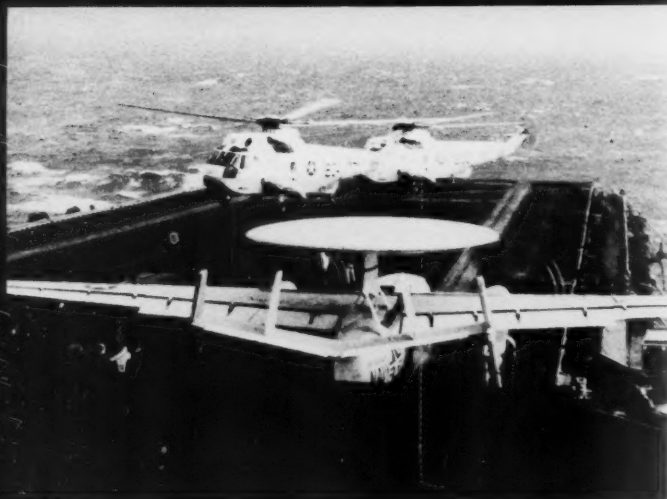
and Truckin'

no "horsepower"; it had little voice; it had little interplay with the rest of the embarked Air Wing; and it unfortunately suffered from lack of sincere concern for its welfare. *Catastrophic helo mishaps were frequent, and mistakes were repeated over and over from ship to ship. (Editor's italics.)*

As a new member of the CVW, the HS squadron came into the new CV environment with a significant number of advantages on its side right from the start:

- We were identifiable and autonomous, and along with the commanding officer, deployed as a unit. This immediately gave us a necessary "voice" and depth in numbers in what we were doing.
- We were an equal member in the Air Wing. This gave us the "Command Clout" so necessary in the implementation and alteration of planned and existing operating procedures.
- Being an autonomous unit, we came aboard with a





sound foundation in shipboard operations. We were a squadron accustomed to operating in accordance with established procedures as set down by OPNAV and NATOPS.

- We were a command with an established SOP/NATOPS program. There was little new on the horizon that had not already been addressed either in NATOPS or in standard procedures.

- We were a mission-oriented squadron — not simply an add-on, but an aggressive, offensive and defensive, ASW mission-oriented squadron that was also assigned the secondary utility mission.

- Being a squadron, we came aboard with a pride of unit identification. We had pride in our mission, pride in our capabilities, pride in our fellow squadron mates, and pride in ourselves.

Our integration into the CV was not really one of trying to do away with past prejudices, but one of understanding each other's missions, limitations, and problems. We had to understand the ship's problems,

and they in turn had to understand ours.

Our first step was in living strictly by the guidelines as established in NATOPS without variance. We found that this did not cause antagonism, but became a learning process for those concerned with flight deck evolutions.

We further enhanced this learning process by routinely assigning a HAC (Helicopter Aircraft Commander) to Pri-Fly to provide the Boss with an expert to prevent unnecessary transmissions between aircraft and tower, or primary and the readyroom, when problems arose. This provided not only an available source of helicopter information, but also an extra set of eyes and ears to aid in maintaining our strong NATOPS standardization program.

Benefits were realized from the many hours spent in the tower in the form of increased Air Boss awareness of helicopter operating limitations and envelopes, plus always having the HAC in the aircraft apprised of any condition that might have a bearing on his flight safety. Incidents not specifically covered in NATOPS were immediate items for the standardization board and were



soon covered by squadron SOP.

We quickly found that our SOP file began to fill with many new and unique items as a result of our own transition to a CV environment. Those germane were forwarded to the community NATOPS manager.

Our safety department contributed to our awareness program by providing the necessary attention to reduce flight deck hazards. Included were the elimination of unnecessary personnel on the flight deck when *helo only* flight operations were being conducted, improved FOD control, and high exposure to FOD education.

Perhaps the most vital part of our integration program was a continuing high standard for pilots qualifying as aircraft commanders. The program stresses not only mission knowledge and procedures, but focuses



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on those necessary areas of aircraft limitations, standard operating procedures, and shipboard SOP. A HAC must be able to hack it.

Our approach to operations was to know what the parameters were and not vary from them, to help others understand our limitations, and to help them learn more about our mission and our aircraft.

With our foot in the door of the attack/fighter community, it is now our responsibility to maintain the credibility we've attained through professional and precise airmanship and an intimate knowledge of our aircraft and missions. Only through a NATOPS program steeped in constant analysis of systems and repetition of

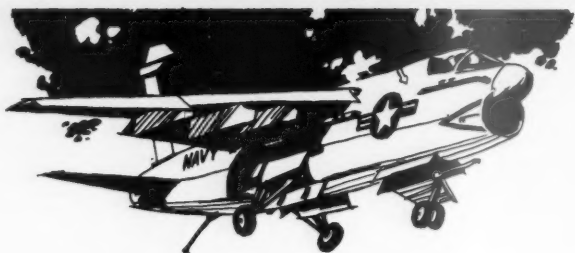
emergency procedures, periodic review and updating of SOP, and assurance of the use of highly qualified and responsible aircraft commanders can we attain success and progress in this new mission environment.

We now have the means and momentum to completely dispel the old CVA rumors that helicopter pilots take second seat. We need not only to prepare ourselves thoroughly and professionally, but also to stand up and demand equality plus recognition for our unique capabilities.

It's true that we're still learning, but we're progressing rapidly and effectively. It's only been ONE YEAR, AND WE'RE STILL TRUCKIN'.



AIR BREAKS



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The Flight Isn't Over Until...

After normal secure, the *Aztec* was returning to the line following a logistics flight. The taxi director and a lineman proceeded to the parking area. The lineman set the chocks down, one on either side of the intended parking spot.

The taxi director sighted the U-11 as it approached the ramp and began directing it, using standard hand signals. The pilot eased it along the yellow painted stripes until close to the parking spot. The director didn't signal a turn, but the pilot turned about 45 degrees anyway. The taxi director continued with the lineup signal, but the pilot ignored it. The aircraft was being parked — some 10 feet left of the intended spot.

The taxi director could not see one of the chocks until just before contact, and his emergency stop signal was too late. The pilot stated later that for the last 20 feet of roll, his attention was fully focused on

the director. He was aware of the chock, but didn't see it standing on end. As he saw the emergency stop signal, the port prop struck the chock. The pilot secured the *Aztec* and was advised the prop had struck the chock.

The pilot's command qualification was revoked. Hereafter, for a month, an officer will observe and supervise arrivals and departures from the ops line during normal working hours. Linemen and taxi directors will be trained on taxi procedures, and QA will audit line procedures — specifically, storage and handling of chocks, tiedowns, and firebottles.

Rollout Stupidity. The PPC of a P-3, after completing a 5-hour flight, prepared to return to Homeplate. Stout fellow that he was, he requested local weather. It was reported to him as follows: ceiling indefinite obscured, visibility 1/16 in fog, wind 230/02,

temperature 41, dewpoint 39, altimeter 29.82. The runway was reported wet following heavy rain.

The pilot requested and received a GCA to minimums and advised he would proceed to his alternate if unable to land. Approaching minimums, he saw the runway approach lights, then the runway lights. He was slightly right of centerline and made a minor correction to the left. He touched down between 3000-3500 feet down the 8000-foot runway.

He landed with approach flaps and used normal engine reversing. The first indication of his position relative to the end of the runway was the appearance of the runway end indicator lights. He believed his rollout speed had been reduced to taxi speed, but this was an illusion caused by the fog. When the pilot saw the lights, he went to max reverse and hard braking. The *Orion* slowed more, but not enough. The big bird continued past the threshold onto the ice and snow covered concrete blast area. The nosewheel ended up in the mud, but the mainmounts remained on the concrete.

The engines were secured, and the aircraft was pushed back onto the runway. After the engines were restarted, the embarrassed pilot taxied back to the line. No damage was incurred.

If the PPC had preplanned his approach, landing, and rollout, the aircraft could have been stopped with plenty of room remaining.

PEL. The pilots of an SH-3D were tooling along airways enroute from Davis Monthan AFB to NAS Imperial Beach. About 15 miles east of Yuma, a crewman reported he smelled oil.

There were no discrepancies visible, but the No. 2 engine indicated a small power loss. A PEL (precautionary emergency landing)

was made at MCAS Yuma just to see what could be found. An investigation revealed a fuel leak in the No. 2 engine from a crack in the fuel pump casing.

The pilots reacted properly at the first presence of an unusual odor. Their timely action could easily have prevented a catastrophic mishap. Good headwork in the seat just can't be beat.

What You See Is . . . A CH-46 was unfolded on a deck spot in preparation for a routine shipboard launch. The crew chief visually verified from the flight deck that all rotor locking pins were out. A control check by the pilot revealed no discrepancies, and a normal engine start was made.

Winds were reported as 15 degrees port at 28 knots, and the deck was stable. The HAC released the rotor brake, and after several revolutions, the bottom of the aft red blade struck the top of the sync shaft tunnel fairing, just aft of the forward hinged fairing assembly. The crew felt a shudder and were notified by Primary that a portion of the tunnel fairing appeared to be torn and flapping in the wind.

The pilot secured the aircraft, and as the rotors came to a stop, the aft red blade again contacted the flapping, ripped portion of the tunnel fairing.

An inspection determined that the aft red pitch lockpin wasn't completely extracted from the

pitch varying shaft aligning hole. It was concluded that the incomplete locking pin extraction caused the unusual flightpath of the aft, red blade at low RPM, resulting in the blade flying low enough to make contact with the tunnel fairing. The squadron established an SOP to verify complete pin extraction — climb on the aircraft and inspect both rotor heads.

Apathetic. Helicopter No. 1 turned off the 180 and called for a touch-and-go. Tower instructions were to touch down at midfield to provide room for helo No. 2 to land on the approach end of the duty runway. Helicopter No. 1 touched down at midfield per instructions, continued his roll, and lifted. He was on climbout at about 50 feet when he received frantic instructions from the tower to "hold short." When you're airborne, just what does "hold short" mean?

Even though he wasn't exactly sure, the pilot of No. 1 got the message in the tone of voice of the tower operator, assumed he meant to stop, and quickly honked the helo up into a quick stop. With his helicopter cocked up in a pretty steep, nose-high attitude, the HAC saw a great big helo, No. 2, just about 50 feet directly overhead. (Their rotors almost overlapped.)

You can guess what had happened. The pilot of No. 2, without a care in the world, had

also executed a waveoff without so much as a "by-your-leave." He didn't get permission, didn't call the tower to advise what he was doing, didn't roll to the side of the runway, didn't pour on the power and climb on his waveoff — he didn't do anything right!

Only an alert tower operator and the quick response of the HAC of helicopter No. 1 prevented a midair.

Wristlock. While taxiing forward on the bow after landing, the pilot of an F-4J was directed to shut down the starboard engine. After the aircraft had stopped and while being chocked, a two-man linecrew approached to service the engine oil. One man monitored the pre-oiler, while the other attempted to disconnect the pressure caps from the fill and overflow adapter assemblies. This meant reaching through access door 81R. Upon receiving the proper signal from the yellow shirt, the pilot shut down the port engine.

With both engines shut down, electrical power also went off and caused the auxiliary air doors to slam shut violently. The man with his arm through the access door received contusions and abrasions of his right wrist with soft tissue trauma.

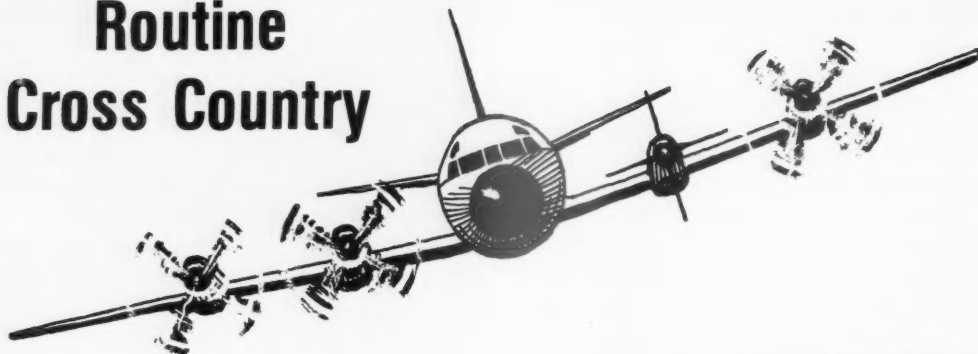
The injury was not a result of improper or inadequate training, but strictly a failure of the man to follow prescribed procedures. ◀

B.C.

by johnny hart



Routine Cross Country



By LT B. L. Palmer
NARDET, Pax River

IT WAS going to be a pleasant weekend. Our coast-to-coast cross country was approved with CAVU weather forecast and only 40 knots on the nose going west. Perfect. Even maintenance got into the act by providing us with a 4.0 aircraft.

Well, I won't try to kid you. This was too smooth. Just overhead Mile High City, the flight engineer announced, "Gen No. 3 OFF light."

Wait one. Did this bird have AYC-314 installed? Our squadron had three aircraft with, and six without. Which did we have? The discrepancy book had no notation, the generators weren't labeled, and I hadn't asked. Too bad. Also, too late to ask. So, we initiated generator reset procedures, but no luck. OK, Flight, feather No. 3.

Our original destination had no P-3 support, so we diverted to P-3 West. After landing, postflight troubleshooting revealed a bad supervisory panel — and no AYC-314 installed. By the time the panel was repaired, we had already decided to RON and go forth the next day.

Early next morning, we continued to our original destination — an uneventful flight with that evening centered around solving all the world's problems.

The next day and time to go home. Weather wasn't quite as good. For example, we had lost our 40-knot tailwind going back, but we still could make it in 7.5 hours.

Start, taxi, and takeoff were normal, and we were on top at FL180. Just as we were passing Tall Mountain AFB, things began to deteriorate.

"Firewarning on No. 2."

"Roger, feather No. 2, HRD No. 2."

"Prop feathered, feather button light out, checklist."

"Northwest center, Sickbird 23, we are declaring an emergency."

"Sickbird 23, repeat, unable to copy because of loud horn in . . ."

"This is Sickbird 23, request vectors to Tall Mountain AFB."

"Flight, give me alternate HRD No. 2."

"Pilot from afterstation, no smoke or flames visible back here."

We made our routine landing followed by a parade of little red trucks.

"Hey! What's happened to the 'pleasant' weekend?" The rest of the day we spent scrounging parts. The HRDs were replaced, but the cause of the firewarning light couldn't be located. We called home to explain the situation and requested permission to make a three-engine ferry back to P-3 West.

We were granted permission and then conducted a thorough review of NATOPS. When ready for takeoff, with the prop on No. 2 at attention, the Air Force tower called and wanted to know, in a strange-sounding voice, if we wanted to notify anyone along the way. (I swear he was thinking of NOK.) We said negative and let him know that Center was aware of our problem.

The flight to P-3 West was routine until we asked Approach for a GCA pickup. As we turned GCA final, the flight engineer said, "Generator No. 3 OFF light." Wasn't that great?

"Sickbird 23, you're above glide slope."

"Start the APU."

The copilot chimed in, "You're 5 knots fast."

"When we touch down, secure No. 3."

"You're below glidepath . . ."

Various other conversations continued on and on until landing. (Someone called it a touch-and-go.) Oh, well, no sense dragging this out any more. After 5 days, we made it home.

One thing is evident on reviewing the week. The days spent in the books and simulators and the hours in flight spent practicing emergencies all allowed this to be a routine (? — Ed.) cross country and not something else.

Bravo Zulu



ON 21 November 1973, a C-117D took off from Hornafjordur (Hofn), Iceland, enroute to Keflavik, Iceland. This was the return portion of a round trip, the first portion of which had been flown without incident earlier in the day. Aboard were CDR James D. Wicke, USN, aircraft commander, LT Gregory G. Fletcher, USN, copilot, and three crewmen:

- Edward T. Hall, ADR1, USN, plane captain
- Marvis A. McManus, ADR1, USN, plane captain in training
- Clyde A. Swasey, ADR1, USN, plane captain in training

Also aboard were two USAF passengers.

Approximately 25 minutes after takeoff, the *Skytrain* entered clouds and encountered light to moderate icing. Carburetor air temperature was being maintained at +20°C (NATOPS minimums) and prop deicing (alcohol) was on.

After a few minutes, the aircraft broke into the clear. Shortly thereafter, the port engine backfired. The mixtures were placed in rich, and fuel boost was turned on. All engine instruments read normal, so the boost pumps were secured and mixtures returned to auto lean.

The aircraft entered clouds again and, contrary to the weather briefing and their experience earlier that day, encountered heavy icing and moderate turbulence. Both engines began losing power with RPM decreasing, manifold pressure increasing, and fuel pressure fluctuating. Carburetor heat was placed in full hot, and carburetor alcohol turned on. Wing and tail leading edge deicer boots were on and operating.

Since the aircraft was in the vicinity of a 5000-foot glacier, the aircraft commander (in the right seat) instructed the copilot to turn south toward the water. The

aircraft was descending rapidly with airspeed being maintained at 120 KIAS. The aircraft commander informed Reykjavik Control of their emergency and reported that they were descending.

During the descent, the aircraft commander and the plane captain continued their attempts to restart the engines, but without success. At approximately 2500 feet, the aircraft broke out of the clouds. They were over the coastline.

At about 1500 feet, both engines began surging up to 2900 rpm, but would not develop sufficient power to maintain flight. The aircraft was turned to parallel the coastline which was almost directly into the wind. They prepared to ditch, but a last-minute decision was made to crash land on the beach.

The aircraft contacted the surface in a left wing down attitude at approximately 60 to 70 KIAS, full flaps extended, landing gear up. The C-117 slid to a stop in about 90 feet. The cockpit was secured in accordance with NATOPS, and all hands exited uninjured through the main entrance door. Within a few hours, they were rescued by helicopter.

Investigators concluded that induction icing was the cause of this mishap.

COMNAVSAFECEN joins other aviation commanders in commending the crew of this aircraft for their superior airmanship during the descent and crash landing on hazardous, unprepared arctic terrain.

Well done! ◀

Publisher's Note: This exceptionally thought-provoking article develops further the line of thought started in LCDR R. A. Hess' article "System Safety and the Decision Maker" in the Jun '73 APPROACH. It should be mandatory reading for all aviation commanders and heads of divisions/squadron departments.

RADM W. S. Nelson
COMNAVSAFECEN

CHAOS INDEX

By CDR W. D. "Zip" Zirbel, CO, VA-95

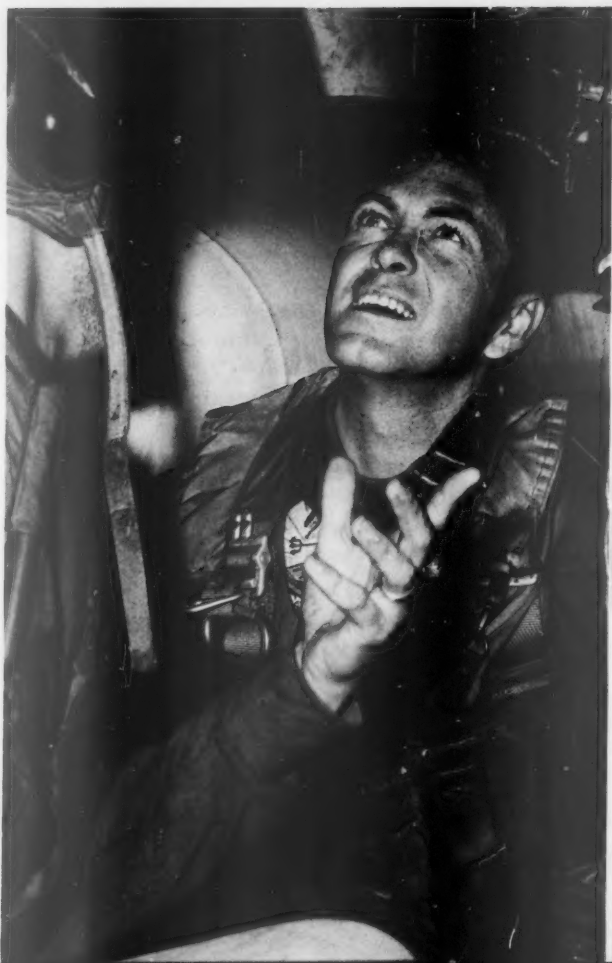


8 COULD you name the most accident prone throttle jock in your squadron? Whom do you think of? Vertigo Vic who is shakey on the ball at night, or Casual Cal who thinks flight planning means he filed a DD 175? Both have characteristics that may elicit your suspicions, and yet they have survived to this point.

Every naval aviator has proven himself many times, and unless there is a change in the situational requirements or the individual, he will walk away from every landing. How can we recognize such a change? It could be an obvious fundamental difference such as his marriage breaking up, or we might observe a quantitative variation in his carrier landing performance. In either case, he might be considered a prime candidate for a pinky tonight and a little special counseling.

Suppose the same analysis is applied to the whole squadron. Let's accept that everyone is accident prone to some degree, and our objective is to keep the risk at an acceptable level. If there is reason to believe that we're becoming more accident prone, we would logically ask why and take corrective action. Don't wait for the accident board results to get our stuff together. Maybe that's like saying because the CO is a Sagittarius, tomorrow's a good day for a safety standdown. How can we tell *today* we're going to be more accident prone *tomorrow*?

Certainly, every CO has a gut feeling that today's ops will be more or maybe less safe than yesterday's. Three nuggets flying tonight, and the deck is pitching — an





increased vigilance is sensed in "rocket one." That's easy because it's an extreme case, but in fact, most accidents seem to hit when least expected. Maybe the preceding operations weren't all that routine.

Why do gut feelings let us down when we try to prevent the everyday accident? Perhaps it takes a lot more experience and attention than realized to really assess the accident potential of daily ops. Unless one is blessed with exceptional perception, he needs to apply some kind of orderly observation and analysis of today's activities and compare it with the preceding day's results.

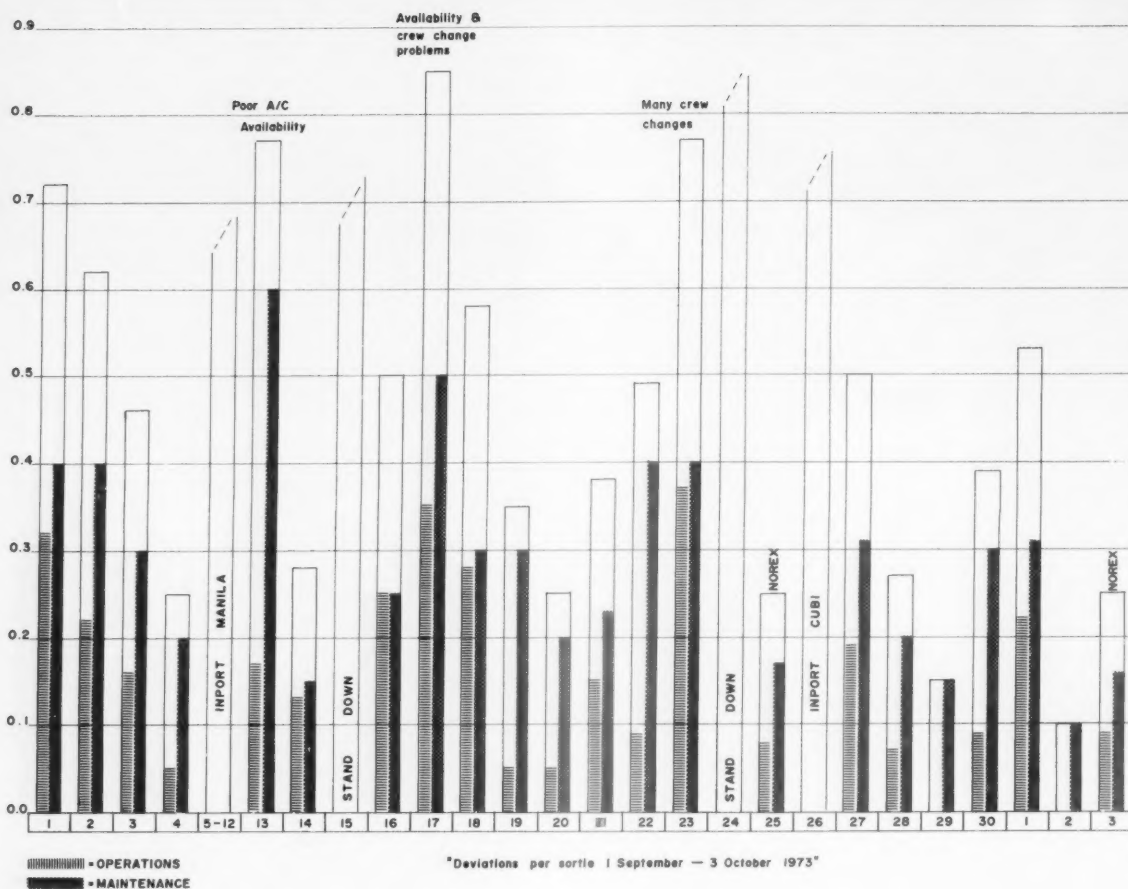
Suppose we borrow from the stock market analysts. They have years of experience in predicting the future. Market analysts are generally either fundamentalists or chartists, and they seldom agree on the forecast. Nonetheless, they have a good handle on what the results were and the trends are.

I submit that is where we have failed in our statistical accident analysis. At the squadron level, we really don't know how we are doing.

The "problem" is that there are not enough accidents within one command to compute a daily accident rate. Hopefully, a command doesn't even have an annual rate. But, there are daily events that can be quantified to compute trends. These events should logically be those that have some functional relationship to the fundamentals of safe or unsafe operations. For example:

- A ground or air abort.
- Failure to complete a mission.
- An unbriefed maneuver or weapon release.
- A change of crew or mission.
- Unscheduled ACM or low-level flight.
- A late launch or recovery.
- A repeat discrepancy on the aircraft or in a COM/NAV system.

To borrow a term from the Air Force, each of these



events is a deviation. A deviation in itself may be a positive action oriented toward safety. For example, a ground abort because of a hydraulic leak is much better than accepting a one-rag leaker. It still scores as a deviation, and the command that has a high incidence of ground aborts is likely to be launching a few that could benefit from better maintenance. Put enough deviations together, and they add up to chaos, and a squadron that accepts a high chaos level will sooner or later be shocked by that unexpected accident.

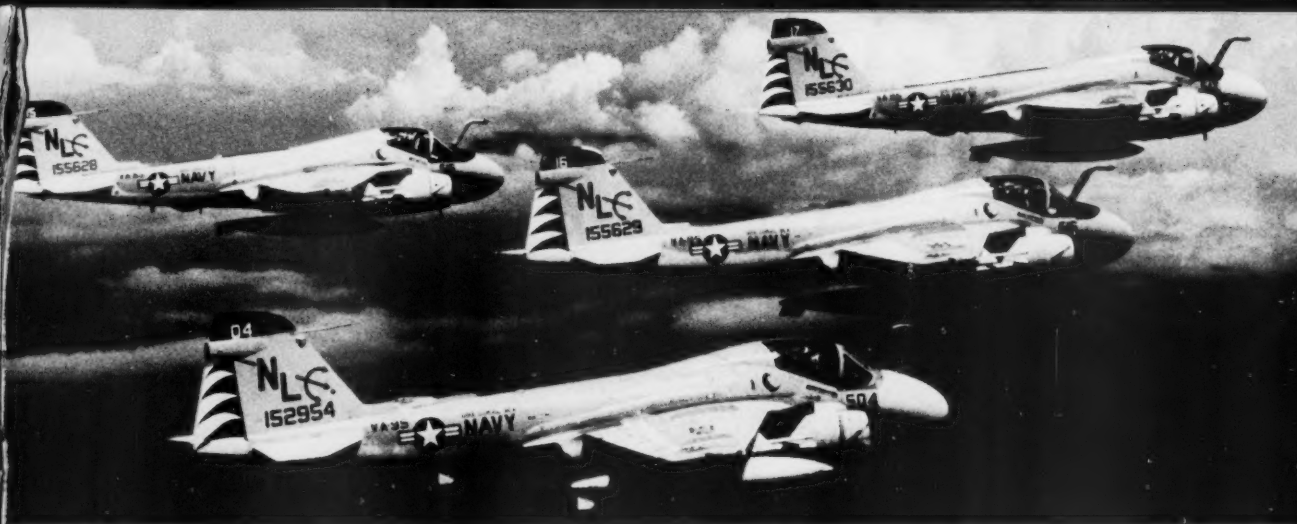
The variety of these deviations suggests that to consider them collectively may be as illogical as adding apples and oranges. But, they all have the common element of being unplanned. They are all indicative of a chaotic organizational "output" that does not reflect the planned or desired management "input." A chart of these deviations could provide a measure of feedback to enable the manager to take corrective action before the output develops into a disastrous accident.

The mechanics of drawing up a chart can be

approached in many ways, as any good gundecker knows. In this squadron, the safety officer keeps it active, but the squadron duty officer does the analysis of his day at the helm. Each crew fills out training cards at the end of each flight for the training officer's records. The SDO notes any deviations observed or recorded on these cards, then decides whether the deviation is of management concern to the maintenance department or the operations department. The number of deviations attributed to each department is divided by the number of scheduled events. The deviations are then charted for the day to show the chaos index for each department as shown on the chart.

Use brown for maintenance and blue for Ops, and the total is the command's daily accident prone rating. The criteria or definitions used to score a deviation will have a large effect on the score. But, if deviations are clearly defined, the daily trends within a command can be a clear signal of a changing chaos level.

All this charting and analysis is far from scientific. It



is highly dependent on gut feelings that sense which events have relation to the probability of an accident.

Each command would undoubtedly define deviations differently, but a deviation should be an event that the command would like to eliminate. Deviations can't be measured unless people start paying attention to them, and that attention will have an effect in itself. Thus, the indirect effect of trying to see the trend is to create a long term trend toward more orderly and controlled operations. On the short term, there will still be days when everything turns to worms. But if you're watching the chaos index, this is a valuable signal to increase supervisory attention and safety margins.

As shown on the chart, this unit operated on deployment at the rather sick rate of about 0.3 — three deviations for every 10 scheduled events. When that rate went above 0.5, we cut back on the schedule and pressed for increased control and supervision in maintenance or operations as appropriate.

I can't prove there is a relationship between incidents and accidents, but it seems reasonable that if the incident doesn't lead to corrective action, the accident can't be far behind. That's what it's all about. Not any scientific discovery, but if you're baffled by all those signs of the zodiac, you might try creating your own horoscope.

11

Quit Too Soon

A mech, during phased maintenance on a CH-53, attempted to fold the tail pylon to gain access to the white taillight. He used the manual folding procedure and exercised the hand pump for several seconds with no evidence that any folding had begun. Neither of the red safety flags popped to indicate the pylon was unlocked.

Since he heard or saw no evidence of folding, he concluded there was air in the hydraulic lines and ceased his efforts.

Three days later, with the helicopter parked on the line, the tail rotor was observed spinning rapidly. Maintenance personnel were summoned and folded the pylon to a position out of the wind so that the tail rotor could coast to a stop. Then they attached tiedowns.

The pylon had been partially folded allowing the spinning tail rotor to damage the disconnect coupling splines. The mech had pumped enough pressure to partially retract the locking pins.

There was air in the system, however, so sufficient pressure wasn't present to allow full retraction. The mech, in retrospect, just didn't hang in there.

In the squadron, pylons are to be folded only by crew chiefs and a small number of qualified, designated maintenance people. The mech was neither.

No one knows why he didn't mention his problem to anyone.

This mishap was the result of an unqualified mech attempting to perform an unauthorized task without supervision.

(Note all the ingredients needed for a mishap — unqualified, unauthorized, and no supervision. — Ed.) ◀

Anymouse



RUSSIAN ROULETTE, MEAT SLICER STYLE

12

AS a cautious blackshoe, unexposed to aviation shortcuts or protocol until recently, I shudder even now when I think about the brownshirt who centerlined the lower prop blade of a C-118 which had, only seconds before, shut down after arrival at NAS.

It is only logical for me to surmise, basing all conclusions on previous limited experience with reciprocating engines, and taking into account the higher ignition temperature of avgas, that said brownshirt would surely lose some portion of his body to which he must have become quite attached over the years. It seemed to me that he knew the engines would not fire, and from observing his expediency, he knew the line chief (totally unconcerned) would surely have his first class crow if those blades weren't all matched at the 180

within 30 seconds after shutdown. Could you please explain to me why my thinking was apparently wrong and my fears unfounded, because when I opened my eyes and began breathing again, all was well? I suppose I was also the only one to lose any sleep over the matter.

Blackshoemouse

For a blackshoe, you dig the aviation scene just right. Sorta makes you wonder if those dudes use the same zero smarts making repairs on the bird.

Don't Do It Yourself

THIS basic jet stud, in preparation for a routine BI hop, conducted what he thought was a routine preflight inspection of his airplane. During preflight, however, I noticed that the nose gear locking

handle could not be pushed to its latched position. The handle was bent to one side. I took out my trusty dzus key and, with a little elbow grease, bent the handle back in line and latched it.

After a normal takeoff, I tried to raise the gear and . . . ugh! The gear handle was frozen DOWN. The tips were dumped, and a safe landing was made.

Fellow studs, take it from a fledgling. Fixing your airplane ain't like working on your car. If something's wrong with your bird, call someone who knows for sure what to do about it. Maintenance should be left to the people who are trained for it. Leave your bubble gum and baling wire at home.

Anymouse

Waiting to Happen

RETURNING from a local training flight, a GCA was requested to RW 31L, and Approach Control was advised that our receiver was weak and scratchy. With weather being 600 feet overcast and 1 mile visibility in heavy rain, the student copilot was briefed to call "field in sight."

The approach progressed normally, but headings were difficult to understand, and a strong crosswind in the rainshower caused the controller to call for missed approach if runway not in sight. The copilot had not called

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT,
PREVENT AN ACCIDENT



the field in sight, but I could see the ground. I glanced up and spotted a runway at 12 o'clock at ½ mile. Immediately, I notified GCA the field was in sight.

As we passed over the threshold, the numbers became clear . . . 31R . . . the wrong runway and 3000 feet shorter than 31L! This field does not have a PAR approach to 31R. With ½ inch of water on the runway and the visibility so poor you couldn't see the upwind end, it was indeed a surprise.

Later, the copilot said he could see both runways a mile out, but did not say anything because he *thought* I had the field in sight. Reviewing all the circumstances which could have resulted in an accident, it is worthy of note that when you least expect it is when a pilot can be hit with a very unpleasant surprise. Complacency can catch up with any pilot if he doesn't keep a continuous guard for the smallest unusual incident. The result could be tragedy.

GCAmouse

For thoughts on the bashful copilot, see "Along for the Ride," APR '74 APPROACH.



Back in a Flash — Almost

ON a routine stopover at NAS Overseas on an IFR cross-country flight plan, I requested minimum ground time to return the aircraft to Homebase ASAP for another flight.

Approximately 20 minutes after shutdown, I returned to the aircraft and found the fuel truck just pulling away. Transient alert personnel were most helpful in all respects and the plane captain knew all the hand signals. I checked droptank fuel, as I only wanted them half full.

After landing at Homebase, it



was discovered that the fuel covers on the fuselage tank and one wing tank had been left open. There was fuel in the aft hellhole, and a fire was definitely possible.

The pilot is responsible! In an effort to expedite things, he had to relearn the age-old rule that haste makes waste. Given only slightly different circumstances, his haste could have ended in tragedy.

Anymouse

Yoke Joke

DURING a transport/instrument roundrobin at 9000 feet, 160 KIAS, the copilot (aircraft commander) of a US-2C informed the pilot in the left seat that he was going to proceed aft to check for leaks and general security. To aid in cockpit exit, he disconnected and stowed the copilot's yoke, removed



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his helmet, and, since the yoke was disconnected, placed the helmet on the right side of the yoke.

As the copilot slid out of the seat, pressure was inadvertently applied to the helmet causing it to activate the elevator trim, giving a runaway up trim. The pilot in the left seat executed proper NATOPS procedures and disconnected normal yoke trim. The source of the problem was discovered, and the trim system was recycled to normal.

Lesson learned: When leaving the cockpit, don't hang your helmet on the yoke!!

Anymouse



As part of a 2-day water survival standdown at NAS Cubi Point, a rescue swimmer is dropped in a "10-and-10," 10 feet above the water at a speed of 10 knots.



After demonstrating water entry and liferaft boarding after ejection, an aircrew survival equipmentman, a master parachutist and former member of the Navy's Chuting Stars, removes his gear.



Swimmer and "survivor" are rescued in training for what may someday be repeated in real life.

Water Survival Standdown



A "survivor" goes up the hoist along with a rescue swimmer.



Participants from seven commands line up along the highway to practice pinpointing targets with signal mirrors, shooting day/night signal flares, and firing the Mk 79 pencil flare gun. Members of the JEST staff assisted.

WHAT was practiced by pilots and crewmembers in a 2-day water survival safety standdown at NAS Cubi may someday happen in a real-life situation. When and if that time comes, the more training the better. And that goes for SAR crews as well as "survivors."


Taking part in the event were HC-7, VC-5, VP-22, VRC-50, HMMH-462, JEST (Jungle Environmental Survival Training), and NAS Cubi.

HC-7 made 81 water pickups during the exercise. A swimming qualification test — ¼-mile followed by 10 minutes of drownproofing — was a prerequisite. Also preliminary to the fieldwork was an all-morning session on personal survival gear and parachute landing techniques conducted by JEST staff members.

Meet Me at the Beach

Classwork completed, at the station's dependents' beach each student got two Mk-13 day/night flares, a signal mirror, and a Mk-79 pencil flare gun and pencil flare. In turn, each set off their flares, practiced pinpointing a target with the mirror, and fired the Mk-79.

After a demonstration parachute descent, water entry, and raft-boarding by a master parachutist, the first group of trainees waded into the water and swam to the ski float. When their time came to be picked up, they swam past the ski float into deeper water. After pickup, the trainees were dropped off in groups of five at the nearby helicopter pad.

"This water survival exercise provided a unique opportunity for aircrews outside the mainstream of CONUS-oriented training programs to renew their qualifications and keep abreast of the latest survival methods," a spokesman for NAS Cubi Point said. "Response to this initial course has been outstanding." 



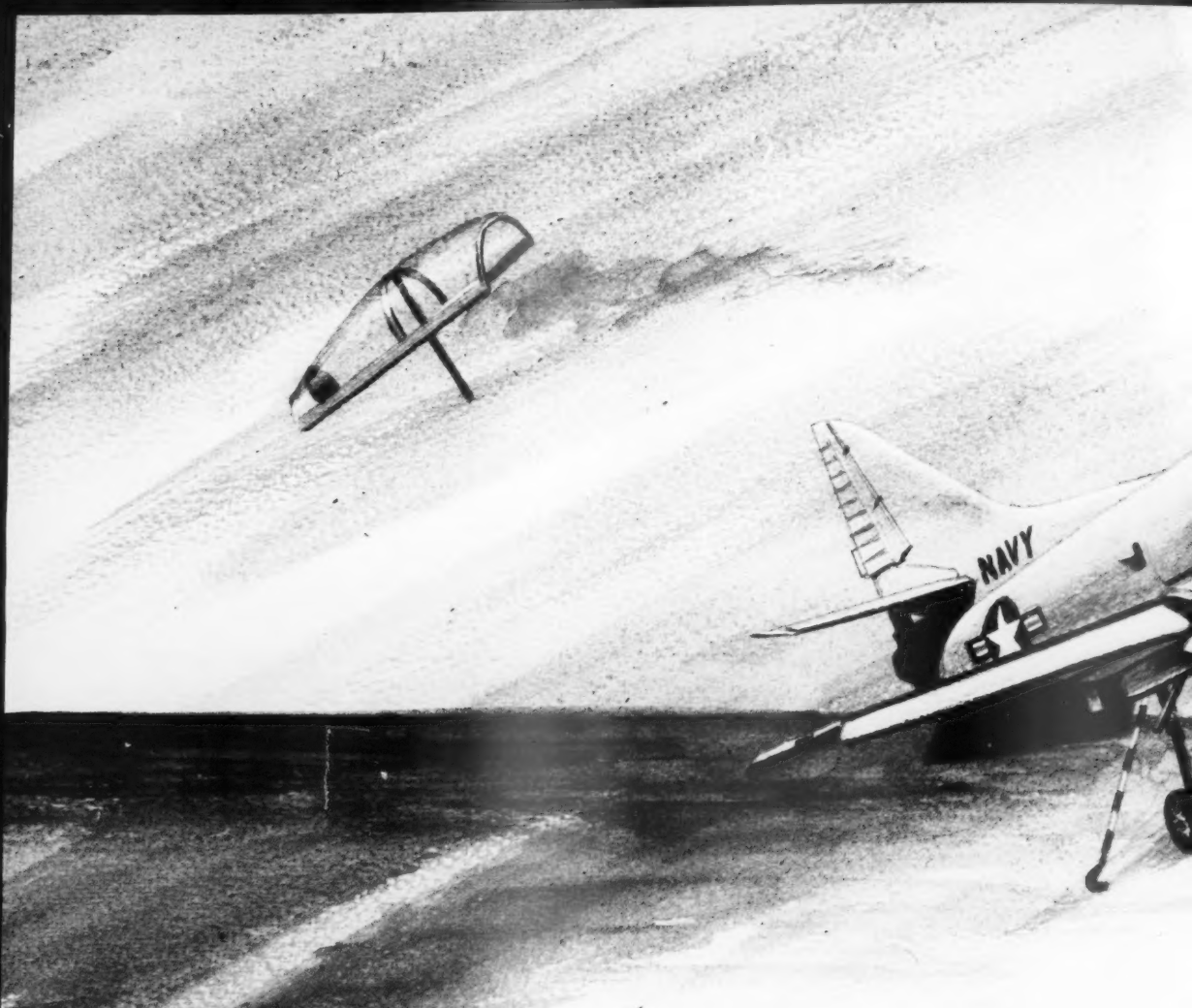
An instructor demonstrates the correct procedure for a ground pickup when the "survivor" is wearing a torso harness.



A rescue swimmer on the HC-7 SAR team waits for the next "survivor" to get into position.



Uniform of the day is flight suit, cranial helmet, lifevest, and sneakers. After swimming to the beach ski float, trainees wait their turn as *Big Mother* hoists a "survivor."



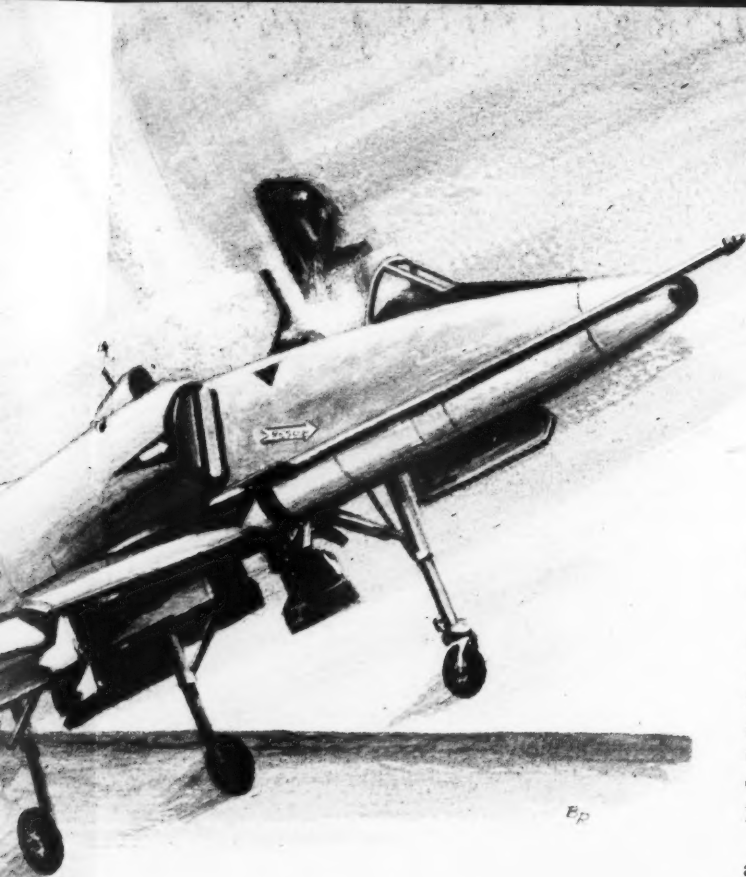
COOL PILOT

LEARN how to find your Koch fittings during parachute descent and after water touchdown *before* you have to do it for real.

After a bolter, a pilot ejected 30 to 40 feet above the water. (The rear seat of his TA-4J was unoccupied.) Before hitting the water feet first, he managed to deploy his raft and inflate his life preserver. He went under, then surfaced face down, still breathing oxygen through his mask.

"In my estimation," he recalled afterward, "I had no time to spare when initiating the ejection. After leaving the aircraft, I was fully aware that I was tumbling. As soon as I stabilized, I pulled the raft release handle and then both toggles on the Mk-3C.

"After entering the water, I reached for the Koch fittings where they are normally located when I'm strapped in the seat. Then I followed the risers upward and released the fittings without further difficulty.



"I feel this point should be emphasized to all pilots: it's extremely important to remember where the fittings will be when you're hanging in the risers. The easiest way to locate them in the water, if you have to, is to grab the risers and follow them until you feel the fittings. Incidentally, the fact that I still had my gloves on in no way presented a problem in releasing myself from the chute.

"I didn't have time to remove my oxygen mask before entering the water. I was able to breathe with no problem while submerged and trying to find the Koch fittings. When free of the chute, I removed my mask.

"The only other difficulty I had was releasing myself from the raft. Through my error, I forgot to release the seat pan lapbelts when I got out of the chute. The raft lanyard became wrapped around my waist, and I was looking for a snap on the seat pan to release it. When I was unable to find one — because there isn't one — I pulled the raft toward me to look for a snap or hook on that end of the lanyard. Again, no luck."

(The pilot apparently mistook the dropline, which connects the upper and lower sections of the RSSK, for the raft retaining lanyard. The raft retaining lanyard is yellow nylon webbing, and the dropline is normally white. — Ed.)

"By this time, the SAR helo was above me and dropping the horsecollar. The helo did not put a swimmer in the water.

"I decided to cut the lanyard with my shroudcutter, but couldn't get a grip on it. I'm sure my wet gloves hindered this effort. With a little difficulty, I found the flap covering the survival knife. The Mk-3C was obstructing it somewhat. I then cut the lanyard and tried unsuccessfully to put the knife back in the sheath. I ended up tossing it away instead of taking the chance of puncturing the Mk-3C.

"After slipping into the horsecollar, I was hoisted aboard the helo and transported to the flight deck with no further incident."

Don't forget the part about the Kochs!



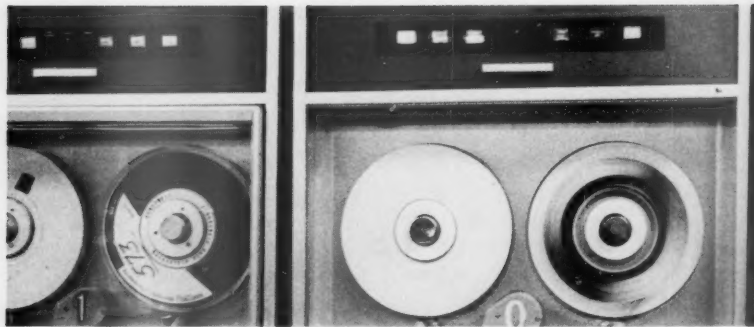
ASK NOT WHAT YOU CAN
DO FOR THE COMPUTER,
ASK WHAT THE COMPUTER
CAN DO FOR YOU

By L. H. Gilpin, Jr.
Naval Safety Center

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THE NAVY'S transition from WWII propeller-driven aircraft to jet aircraft began in the late '40s. From the accident statistics, it soon became clear that modern, high performance aircraft were unforgiving of pilot or aircrew mistakes, faulty design, and poor maintenance. It was, therefore, urgent that the Navy apply more professional methods for adapting these aircraft to fleet operations. The recognition of the need for an intensified accident prevention program was dictated by both humanitarian and economic considerations.

As a result of an alarming increase in aircraft accidents, a naval aviation safety activity was established in 1951 by the Chief of Naval Operations. At that time, the aviation accident rate stood at 5.40 accidents per 10,000 flight hours. In 1952, the activity was moved from Washington to Norfolk. In 1955, it was redesignated the Naval Aviation Safety Center, as a separate command, with the responsibilities of accident research and the promotion of aviation safety.





Both systems were manual and far too slow to be of much value in accident analysis.

In the meantime, machine systems, using 80-column, punched cards for storing data in machine-readable form, had come into general use. This system was adopted in 1952 with the installation of an IBM-402 accounting machine and associated sorters, reproducers, collators, and keypunch machines. This was a significant advance over earlier, manual methods, since it made practical the recording of more data for each accident than had previously been possible and faster processing of this information. But, the ever increasing volume of cards, which eventually reached more than 500,000, led to the abandonment of this system in 1967.

In that year, a high speed Honeywell 1200 computer was installed, followed 5 years later by the addition of a smaller Honeywell 200 to keep pace with the growing workload. The present system consists of these two computers, one with a 114,000-character memory, the

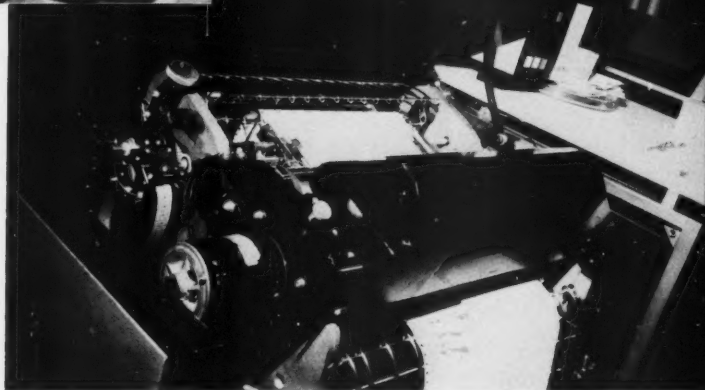


Initial efforts of the Naval Aviation Safety Center were directed toward: 1) establishing more direct lines of communication for the flow of aircraft accident information and 2) initiating aviation safety programs at all levels of command.

In May '68, SECNAV established the Naval Safety Center which consolidated the Naval Aviation Safety Center and the Submarine Safety Center (established in 1964) and broadened the mission to include fire, motor vehicle, surface-subsurface ship, and industrial safety programs.

It has long been recognized that to *prevent* accidents, it is necessary to *study* accidents to identify causes and detect problem areas so that corrective action can be initiated. This required the establishment of accident and exposure data reporting systems, the accumulation of files containing such data, and a method for its rapid extraction and analysis.

The first steps in this direction were taken in 1921 when data relating to aircraft mishaps were kept on 5 x 8 cards. This was followed in 1941 by utilization of a McBee Keysort System which was used until 1952.



other with a 32,000-character memory; 13 tape drives, each capable of transferring 64,000 characters per second into or out of memory; two 900 line per minute printers; and two 800 card per minute cardreaders.

There are presently over 8 billion characters of data stored in the major accident and exposure data magnetic tape files. This volume is increasing at a rate of some 2.5 billion characters annually.

Continued



Processing of such data falls into three general categories: file maintenance, information retrieval, and report generation. All processing is done under the control of programs—sets of instructions, logically ordered to perform certain tasks on a computer. They range in size from fewer than 50 instructions to as many as several thousand and generally follow the pattern of reading data into memory from tape or cards, processing this data in some predetermined manner, and then sending the desired data to a printer or to another tape for further processing.

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Programs are written by programmers in a language called COBOL (common business oriented language), which closely resembles ordinary English, and then translated, by a special program called a compiler, into language the computer understands. Every job to be performed requires its own program or programs.

File maintenance programs are concerned with the establishment of, additions and changes to, a master data file. All files are updated in cycles ranging from daily to quarterly, depending upon the degree of activity of the particular file.

Information retrieval programs are very generalized programs which are specialized, when the program is run, by the introduction of parameters defining the criteria which records must meet to be selected for further processing.

Following the selection of records meeting all specified conditions, the desired data must then be extracted from these records, manipulated as specified by the requester, and the results displayed. Displays will vary from a single line of data to hundreds of pages.

A typical request might be to select, from the aviation mishap file, all carrier landing accidents for fiscal years 1968 through 1973 involving one or more model aircraft and to then decode and print the contents of specified data fields from each record selected.

This particular request would require searching about

75,000 records, each containing about 3000 characters of data, to find those matching the selection conditions and then using these records as input to a program to decode and print the desired information.

To search this many records, selecting on the fields specified, would require about 1.5 hours, the time being directly proportional to the number of fields which must be examined on a record to determine whether or not it meets selection criteria.

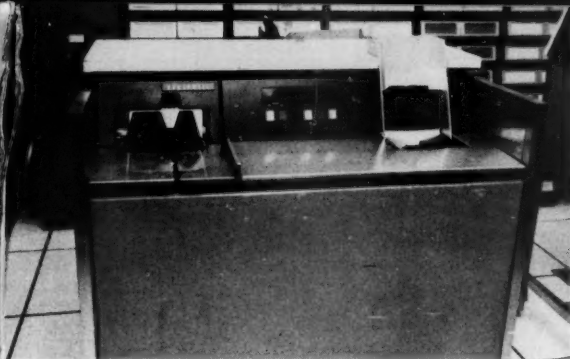
Another example, of particular interest at this time, is a recently conducted study to determine what effects a reduction in flying time, due to reduced funding and fuel shortage, might be expected to have on the aviation accident rate through its effect on pilot proficiency.

To accomplish this, it was necessary to process over 5 million IFARS (individual flight activity reporting system) file records, covering a period of 3 years. Based on data extracted from this file, and the aviation mishap file, pilots were grouped within 10 different aircraft models, by the number of hours flown during the 30-day and 60-day periods preceding their accidents, and the accident rate for each group then computed.

A study such as this would have been virtually impossible to complete without a computer because of the extremely large volumes of data which had to be analyzed.

The speed with which tape files can be searched is high compared to any previously available method. But, because of the steady growth in the size of NAVSAFECEN data files (a 20 percent per year increase in the number of requests) and because the usefulness of data frequently depends upon how quickly it can be retrieved and analyzed, it has once again become necessary for NAVSAFECEN to increase its data processing capability.

Current plans call for the installation of a late model computer capable of running up to 10 jobs simultaneously, utilizing disk storage as well as magnetic



Cross Section of Types of Retrievals

Fatalities Aboard Submarines
 Wingfold Mishaps
 Motor Vehicle Accident Study for AIRPAC
 Shore Fire Safety Study
 A-6 Hot Refueling Mishaps
 Four-Engine Aircraft Lightning Strikes
 Ground Level Ejections
 Water Survival Time Lapse to Rescue
 Inadvertent Activation of Radio or Beacons
 Bird Ingestion
 Study of INSURV Reports on SERVLANT Ships
 Mishaps Caused by Catapult Launch Equipment
 Ordnance Injuries to Submarine Personnel
 Stall/Spin Major Accidents
 Aircraft Brake Failures
 Motor Vehicle Seatbelt Injuries
 Motor Vehicle Accident Study for AIRPAC
 Study of Assault Injuries to Naval Personnel
 Study of F-14 Introduction
 Submarine Accident Cost Study
 BUMED Shore Fire Loss Study
 Egress/Survival Problems Over Water
 Test Pilot School Mishap Review
 Fuel Contamination Study
 Oxygen Mask Fires
 Study of Forklift Injuries
 Difficulty With Liferaft Utilization
 Autorotation Mishaps
 Anthropometric Statistics on Pilots
 Involved in Aircraft Mishaps
 Submarine Battery Fires
 Powerplant Problems
 Study of Power Tool Accidents
 Boat Handling Accident Study
 Destroyer Flooding Study
 Deck Seamanship Accidents
 Study of Decompression Accidents



tape. An idea of the advantage of disk over tape can be gained from the fact that while character transfer rates using tape are 64,000 characters per second, rates up to 500,000 characters per second are attainable with disks.

Just as locating a desired piece of music on a phonograph record is much faster than finding one on a reel of tape, so disk processing is faster than tape processing since it is not necessary to read hundreds or possibly thousands of records to find one specific, desired record or group of records.

With such a system, the entire current workload could be processed in a fraction of the time now required. Studies in greater depth can be made in less time than ever before. The decreasing accident rate, which for the first 2 months of 1974 stood at .84 as opposed to 5.40 for 1951, may be brought down still further — a savings of many lives and millions of dollars. A limited list of subjects for various studies is shown in the box. If you have a problem for which you need safety data, ask us.

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Vertigo

or Spatial Disorientation?

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THE TERM "vertigo" has long been used by aviators to describe a variety of unpleasant experiences in flight ranging from a momentary confusion in reading a flight instrument to complete, white-knuckled, sweaty-palmed panic. Vertigo means one thing to the flight surgeon, another thing to the average pilot. What most pilots refer to as "vertigo," the doctor recognizes as spatial disorientation.

Vertigo

Vertigo comes from the Latin word meaning "turning." Its use should be limited to a false sensation of the world turning or the body turning when it's not. *Vertigo and spatial disorientation are not the same thing.* Vertigo is a type of spatial disorientation.¹

Vertigo is produced by forces acting on an airman's perceptual organs in such a manner as to produce conflicting sensory inputs to the brain. These conflicting cues can leave him with the sensations of tumbling, nausea, and an inability to focus his eyes. Vertigo can occur insidiously during a roll when a pilot turns his head across the axis of rotation and back again. The resultant Coriolis forces set up in the fluid of the inner ear cause conflicting sensory impressions leading to the so-called "Coriolis illusion."

Vertigo in flight occurs as a natural result of the nervous system's response to an environment which it is not equipped to handle. On the other hand,

encountering vertigo on the ground in the absence of motion would lead the flight surgeon to suspect disease of the inner ear.²

Spatial Disorientation

Spatial disorientation can refer to a pilot's being lost geographically with respect to the earth's surface, or it can mean his being literally "lost in space" with reference to the horizon (attitude). Once he becomes reoriented through his flight instruments, however, a pilot no longer has a problem, *unless he is suffering from vertigo.*

Conditions often occur in VMC environments which call for maximum vigilance external to the aircraft, as in formation flight, flight in high density traffic areas, acrobatic flight, ACM, air-to-air gunnery, and loft bombing maneuvers. False horizons, however, may lead the unwary aviator into an unrecognized unusual attitude and a subsequent stall/spin situation.

Misleading Visual Cues

Misleading visual cues may be encountered at night where city lights are reflected on a low-lying cloudbase, presenting a false horizon. For instance, in Canada and Alaska, pilots have been misled by the Aurora Borealis, which presents a beautifully lit horizon above the real horizon at night. Gently sloping cloud decks can mislead a pilot into aligning the aircraft's wings at an angle to the true horizon.

1. Waite, R. E. and Lucchi, M. R.: *Labyrinthine and Proprioceptive Aspects of Aerospace Medicine, Aerospace Medicine*, 2nd Ed., 1971, p. 260.

2. Guedry, F. E.: *The Nonauditory Labyrinth in Aerospace Medicine, U.S. Naval Flight Surgeon's Manual*, 1968, pp. 240-262.

Night or IFR formation flying sets up another condition in which disorientation is easily encountered. Also, disorientation occurs readily at night where a single stationary light will appear to move (autokinesis) due to muscular feedback from the eyes which tends to track randomly in the absence of objects on which to focus.

Spatial disorientation can be produced by conflicts between visual perceptions, signals from the inner ear, and/or misleading sensations from the "seat of the pants" (deep muscle cues known as the kinesthetic sense). According to Clark and Graybiel, "spatial disorientation is due to normal psychophysiological causes which should be regarded as the inevitable consequences of placing man in a task for which he is not fitted, either by endowment or past training."³

Vertigo Training

Vertigo has long been recognized as a problem in naval air training. Attempts to train students to recognize and avoid this phenomenon have traditionally taken the form of teaching the naval aviator to "believe his instruments." Unusual attitude maneuvers are introduced in the instrument flight training phases with the student pilot recovering the aircraft while flying under the hood. Recovery from an unusual attitude is usually accomplished by the student's reorienting himself through use of his instruments. He has overcome spatial disorientation. Therefore, it is doubtful if a student ever experiences the sensations that accompany true vertigo during unusual attitude recovery.

Dangerous Experience

New pilots may find themselves experiencing vertigo for the first time while flying alone. This can be a very dangerous experience. Admittedly, most survive this situation since it is virtually impossible to find an experienced aviator who has not had vertigo at one time or another. But, how many aircrewmembers and aircraft have been lost in the process of acquiring this experience?

Inflight maneuvers should be devised for safely exposing aviators to the effects of vertigo. The insidious nature of vertigo should be demonstrated to them. They should be taught that it is usually encountered when it is least expected, such as in a high speed intercept when the pilot is focusing his attention on visually locating the other aircraft while in a climbing turn.

Effects Can Be Weakened

Research at the Naval Aerospace Medical Institute in Pensacola indicates that the effects of vertigo can be weakened through repeated exposure. It has been established that the aviator experienced in dealing with

vertigo is less susceptible than the novice. It is well known that exhibition ice skaters can learn to spin at rapid rates and then skate gracefully away without stumbling.

Almost 20 years ago, a test pilot at Ling-Temco Vought wrote of his experiences in spinning the F-8. The spin-series tests were so violent that he found himself getting vertigo very easily. To overcome this problem, he preconditioned himself to spins by going out every day and spinning conventional aircraft. After a period of training, he was able to spin the F-8 while minimizing the effects of vertigo.

The obvious hazards of spinning today's high performance aircraft preclude aviators trying this approach, but there are other techniques of learning to overcome vertigo.

NASA Training

When NASA started training astronauts in its three-axis tumbler, they had to proceed slowly on one axis until the man had adjusted to rotation, then they could slowly start the second axis of rotation. After a week of training, they could rotate him on all three axes without making him violently ill. So, it appears that experience with environments likely to produce vertigo enables an aviator to become habituated and learn to anticipate and prevent it by maintaining his head in an upright position while turning or spinning.

Dual, inflight maneuvers designed to demonstrate the following false sensations during level flight should be demonstrated to student pilots by a qualified instructor (the student's eyes should be closed):

- Climbing while actually turning.
- Diving during rollout from a turn.
- Leaning while in a skid.
- Reversed direction while rolling out of a turn.
- Climbing during constant acceleration.

True vertigo is induced by having the student move his head to the left or right and down with his eyes closed while, unknown to him, the IP rolls the aircraft. Then, as the aircraft is rapidly rolled level, the student is asked to bring his head back erect and open his eyes. The lesson to be learned is *never move the head across the longitudinal axis of the aircraft during accelerations* (angular or linear).

Although some Navy training squadrons use such maneuvers, they are not universally standardized. It is this writer's opinion that inflight training should be incorporated in RAG training to introduce vertigo-inducing maneuvers in a controlled flight environment. Such maneuvers demonstrated by a qualified pilot in a dual-seat aircraft would enable the aviator to recognize the sensations/conditions which induce vertigo and the need to avoid them. ◀

3. Clark, B. and Graybiel, A.: Disorientation: A Cause of Pilot Error, BUMED Research Report NM 001 110 100.39, 1955.



One Aviator's
Answer to
That Nightmare
Called . . .

SPATIAL DISORIENTATION

By LT James R. Steel, Jr.
VA-46

YOU'RE probably thinking, "Another article on SD (spatial disorientation)? At least it's a short one."

I thought the same thing when I began flying, but I read them anyway. I was looking for a clue or a secret to successfully fighting disorientation, a most uncomfortable and frightening experience. Two WestPac cruises during the monsoon season can make any pilot flying off an ESSEX class carrier a seasoned instrument pilot. Seasoned or not, SD was always waiting on my shoulder ready to strike in a moment of forgetfulness or neglect.

Not one of the many articles I read, at that time, gave me a solution to the problem save for "Keep an eye on the gages, and should you become disoriented, believe your gages, and fly them accordingly." This was great advice. It helped me keep my trusty A-4 in an upright position. But navigation, communication, and the rest of the functions associated with professional flying deteriorated.

Launching at 0300 on a 1.8-hour go for a road-recce or FAC hop, including tanking, keeping track of your leader, dropping bombs, and marshaling, all with the sensation of being completely inverted, is an unnerving experience at best. The satisfaction derived from a successful night carrier landing afterwards didn't help much when I was scheduled for a similar go the next night.

My first clue to a solution came from a reserve A-4 jock (stretch-8 pilot when home). After asking him what airline pilots do for SD, he informed me that their emergency procedure is to turn the white floods up full bright. Magically, all peripheral inputs disappear, and the sensation is that of being in a Link trainer. (*Intensity of cockpit lighting blocks out confusing external visual cues. - Ed.*)

Disbelievingly, the next time my mind rolled inverted (that same night), I tried it. *It worked like a charm.* After a few seconds, I would roll the floods down and be merrily on my way. I admit that it must have looked

ridiculous to my wingman, but I was glad I'd found an answer. (*This is a method of forcing concentration on instruments. Loss of dark adaptation and, therefore, peripheral cues will pose a hazard in some situations. - Ed.*)

Since then, I've discovered other means of combating disorientation which are less extreme, and at most times, equally effective. I haven't had to turn on the floods for some time now. I pass these gems of experience on to you now to put in your "for what it's worth" file:


(a) If you are not flying "IFR parade" or don't have a wingman who is, make all turns in a positive manner, ensuring you feel both the entry and completion of each. Trying to be too smooth only confuses the issue because your inner ear may sense no motion, but your eyes will; therefore, *you* become disoriented.

(b) If your aircraft is autopilot-equipped with an attitude hold feature and you are prone to disorientation, let "George" fly it. After a frequency change, check the gages. They'll be the same as before.

(c) Unless you must keep an ever watchful vigil on what is happening outside (like flying wing), keep the seat as low as possible and the instrument lighting as bright as you can.

(d) If you start to become disoriented, don't go looking outside for a horizon. If there were one visible, your peripheral vision would have picked it up to help keep you oriented. You'll only confuse yourself more by looking outside.

(e) Don't use rotating beacons if you're flying in clouds or thick haze - they can really blow your mind (and your wingman's).

If you have your own procedures for whipping this problem, it won't take much to get you psyched up to do your thing in the black or in the clouds. Confidence and knowing what to do is what it takes to keep disorientation under control and make the extra challenge of night/all-weather operations actually enjoyable. 

Approach Lighting Systems

LEGEND INSTRUMENT APPROACH PROCEDURES (CHARTS) APPROACH LIGHTING SYSTEMS - UNITED STATES

Each approach lighting system indicated on Airport Diagrams will bear system identification letter (A, B, etc.) indicated in legend.

A dot "e" portrayed with approach lighting letter identifier indicates sequenced flashers (F) installed with the approach lights e.g. (A_e)

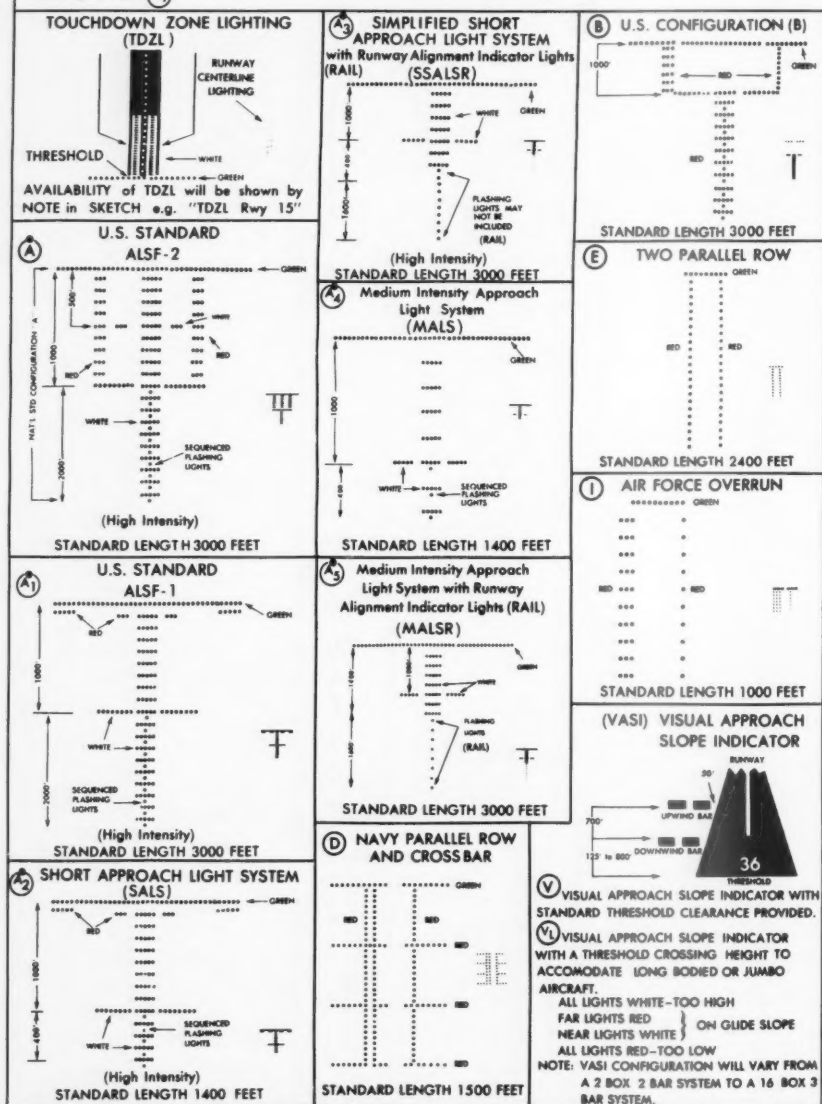


Fig. 1

APPROACH lighting systems are valuable aids during night and instrument conditions. They supplement the guidance information of electronic aids such as VOR, TACAN, PAR, and ILS. Thus, they have a definite effect on operational safety during the approach and landing phase of flight.

Approach lights may be designated high intensity (the basic type of installation) or medium intensity, according to candlepower output. Most runway and approach lighting systems permit the controller to adjust lamp brightness for different visibility conditions or at the pilot's request. The extreme brilliance of high intensity lights penetrates fog, smoke, precipitation, etc., but may cause excessive glare under some conditions.

The approach and lighting systems now in use and their standard lengths appear on a legend sheet in the Terminal FLIP (Fig. 1). Each approach chart indicates the type of approach lighting system by a circled letter on the airport diagram. Actual length is shown on the airport diagram for any system, or portion thereof, not of standard length. The FLIP Enroute Supplement-IFR indicates availability of airfield, runway approach, sequenced flashing lights, threshold strobe, and runway centerline lights.

U.S. Standard ALSF-1

This approach lighting system is used by both military and civil airfields. It consists of a number of lights installed symmetrically about the extended runway centerline,

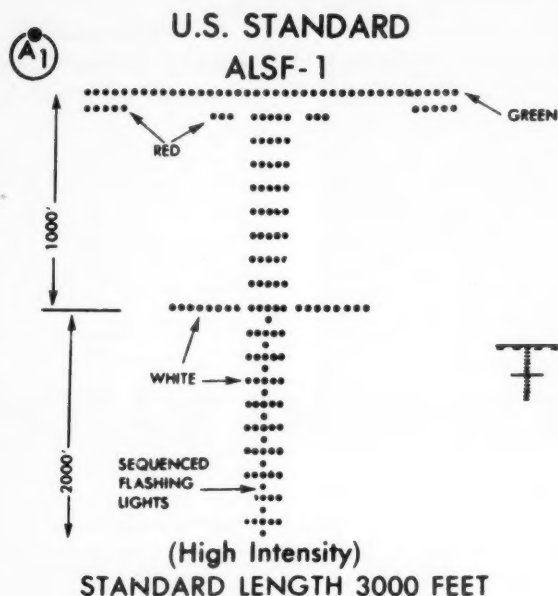


Fig. 2

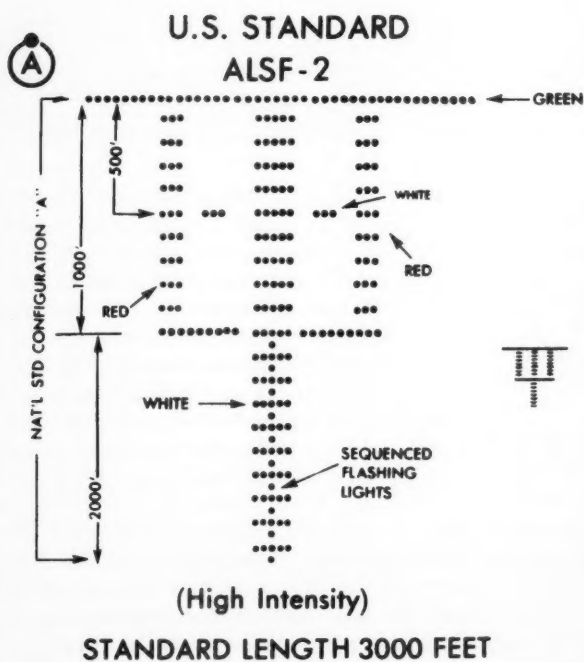


Fig. 3

starting at the landing threshold and extending a distance of 3000 feet outward into the approach zone (Fig. 2). The longitudinal spacing of these light bars is 100 feet. The system provides roll guidance, a distinctive marker at 1000 feet, and a distinctive threshold.

Sequenced flashing lights are centerline approach markers included in this system to aid the pilot in locating the runway threshold during low visibility conditions. Although they normally flash from a distance of 3000 feet to the runway threshold, they may be installed in only a portion of the system. These fog penetrating, high intensity lights flash in sequence, giving the effect of tracer shells being fired at the runway.

ILS Category II ALS

The approach lighting system for ILS Category II consists essentially of a standard ALS, as described in the paragraph above, with the addition of red barrettes on each side of the centerline in the inner 1000 feet, crossbars at 1000- and 500-foot distances from the threshold, and white rather than red centerline barrettes 200 and 100 feet from the threshold. It is designated as U.S. Standard ALSF-2 (Fig. 3).

Touchdown Zone Lighting/ Centerline Lighting

The runway centerline light system consists of bidirectional fixtures installed at 50-foot intervals from threshold to threshold. The touchdown zone light system consists of 3000 feet of unidirectional three-light barrettes disposed symmetrically about the row of centerline lights (see diagram on Fig. 1). The barrettes are spaced longitudinally at 100 feet intervals.

Touchdown zone/centerline lights furnish the pilot an excellent

reference for flare, touchdown, and rollout. The availability of touchdown zone lighting will be shown by the abbreviation of "TDZL" on the airport diagram on the approach chart.

REIL

(Runway End Identifier Lights)

Runway end identifier lights are installed at many airfields to help identify the approach end of the runway. The system consists of two synchronized flashing lights, one of which is located laterally on each

side of the runway threshold facing the approach area. They are effective for identifying a runway which lacks contrast with the surrounding terrain or which is surrounded by other lighting and for approaches during reduced visibility.

Other Systems

Space does not permit a complete description of other systems depicted in Fig. 1. Additional information on these systems may be obtained by

referring to Appendix 5 of the TERPS Manual (OPNAVINST 3722.16B).

Flight Planning

Approach and field lighting are important considerations in flight planning. When filing, always check NOTAMS, FLIP Terminal Publications, and the IFR Enroute Supplement to get the lowdown. This information is not only nice to know, it's essential if you want to understand what you see when you break out on final. ◀

IT DIDN'T HAPPEN ON MY WATCH

By LT F. L. Baca, ASO, VQ-4

... is a phrase heard all too often, both in the sea service and in other organizations. When something goes astray in our backyard or in our office, it's easy to rationalize our responsibility, placing the blame on either our neighbor, coworker, or boss.

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Blame for what? Blame for the daily, minor (but potentially serious) infractions against both written and unwritten safety practices. As my commanding officer routinely warns, "One cannot legislate brains." To try to do so would be to create a perpetual bureaucratic paper mountain which wouldn't even be self-serving.

If it didn't happen on our watch, in our shop, or in our backyard, then together we must methodically search elsewhere. The fact that some infraction did take place can usually be narrowed down to an approximate time, place, and person or group of persons. If narrowed down to a single person in the command, the responsibility and blame usually works its way up to the supervisory level and oftentimes results in an intense effort to prevent its recurrence.

An unfavorable side-effect is that some of those involved tend to shy away from reporting potential hazards because they have indeed been involved in an unfavorable circumstance and do not want to risk another involvement. The same "noninvolvement" feeling rubs off on others not directly involved, and as a consequence, accident prevention efforts suffer. Finally, when an infraction results in serious property damage or personal injury, the resultant attitude is that "He was one of the best pilots"; "That aircraft was in perfect shape"; or "The incident is incredible, how could it have happened?"



When an individual who is the primary contributor to the cause of a mishap is questioned concerning the matter, more often than not he tries to shift the blame. He becomes not unlike a great Bible arbitrator, skillful at "picking fly feces out of the pepper" to explain away or justify reasons for the action or inaction which led to the unfortunate event. Many, however, will feel a slight share in the guilt for such a thing happening in their squadron, their ship, and indeed, on their watch.

But that is the wrong time to share a guilt feeling for a mishap. We must preact to prevent. Let's sit down with ourselves and honestly analyze and evaluate how our watch is going. The fact that the "Old Man" is content and happy does not complete the job. We must satisfy ourselves that we are contributing to the safety of our neighbor and coworker and that they in turn are reciprocating. Perhaps, we might find that there is some improvement to be made for the benefit of all. Ideally, when you and I have done this, the need will be obviated to ever have to say: "It didn't happen on my watch." ◀

notes from your flight surgeon

Carbon Monoxide and Smoking

CARBON monoxide, in addition to nicotine, tars, and other chemical compounds, has been incriminated as a pathologic factor in cigarette smoke. Recent studies have suggested that heavy cigarette smoking — more than 20 cigarettes per day — may result in an intake of carbon monoxide that could impair the performance of the smoker in driving a car or piloting an aircraft.

The average concentration of CO in cigarette smoke is about 20,000 ppm (parts per million) or about 400 ppm in the inhaled mixture of smoke and air. One may even have to take the additive effects of CO in polluted air into account. In Los Angeles, where high atmospheric CO levels have caused concern, the concentration in the air ranges from 7 to 20 ppm.

The adverse effect of CO is that hemoglobin has an affinity for CO over 200 times greater than for oxygen. This can be critical to patients with coronary heart disease because of the resulting decrease in oxygen to the heart.

In aviation, the prime threat of the amount of CO in the blood is the associated decrease in visual acuity. Retinal cells are extremely sensitive to hypoxia (the state of decreased oxygen in the blood). After a person smokes, his visual acuity in bright light does not change measurably. But there is significant impairment of night vision with very minimal hypoxia.

It has been calculated that three cigarettes cause the same reduction in blood oxygen as 8000 feet of altitude. Other studies which correlated the hypoxia of altitude with the percentage loss of visual sensitivity (raised thresholds for



light, or decreased ability to see at night) indicate that it drops 5 percent at 4000 feet, 15 percent at 8000 feet, 25 percent at 12,000 feet, and 40 percent at 16,000 feet.

In addition to the acute effects noted above, there are the long term detrimental effects of cigarette smoking: increased mortality from coronary artery disease, increased emphysema, chronic bronchitis, and increased cancer of the lung. Life expectancy of smokers using less than one half pack per day is 4 years less than nonsmokers. In a two-pack per day smoker, there is an 8-year difference.

There is definitely a need for further investigation into the effects of smoking and carbon monoxide on drivers and pilots. What is most important is that facts and statistics are already known which dictate modifications in our habits.

*LCDR W. F. Schrantz, MC
HMM-264 Flight Surgeon*

Survival Discrepancies

ANALYSIS of the egress/survival/recovery phase of this F-4 accident revealed that the

ejection sequence and all used survival gear functioned as designed. The recovery was executed flawlessly in a rapid, safe, and professional manner by the rescue helicopter crew.

The only discrepancy noted during the egress/survival phase was the pilot's lack of adherence to the proper sequence of procedures. This resulted in his being in the water with no flotation equipment deployed, his parachute still attached, and a few parachute shroudlines around his body. He managed to overcome problems, but if he had been injured and/or in adverse weather conditions, the problems could have been disastrous.

Also of note is the fact that he had no shroudline cutter in his survival vest. If his flotation equipment had malfunctioned, he could have easily been pulled under water by the weight of his survival gear and entangled parachute.


Investigating flight surgeon

Borrowed Gear

AN OV-10 copilot who was not a member of the squadron and was just along for the flight time borrowed his flight gear. He was unable to scrounge any gloves, so he flew without them.

When he ejected and landed on rocky ground, he suffered numerous small cuts and abrasions.

"These could have been prevented if he had been wearing flight gloves," says the investigating flight surgeon.

A plus factor — his borrowed helmet popped off when his head struck the ground smartly, but it prevented serious and possible fatal injury. 



Letters

The road to safety is paved with good suggestions.

Ace L.

Helo Flight Gear

MCAS(H) New River — This letter was prompted by your article in the 23-29 DEC '73 *Weekly Summary* entitled "Unhappiness Is Proper Flight Gear." If your feature article was an attempt to ameliorate our pilots' present attitudes toward their flight gear, I don't believe it was entirely successful. In fact, it drew a few chuckles around here.

I have submitted a few photos herewith for comparison between the "intrepid aviator of the early 1920s" and today's bold helo pilot. Pilots *still* view their flight gear with unhappiness.

Figure 1 shows a pilot clad in one suit of cotton longjohns, bulky "ventilated" (but without ventilating unit) antiexposure suit, fire-retardant flight gloves covered by lightly padded antiexposure mittens, flying boots with one or two pairs of cushion-sole socks, an LPA-1 life preserver, an SV-2A 24-hour survival vest, an M-24 protective mask, and an SPH-3B helmet.

Figure 2 shows a fully combat-equipped aviator with his lightweight summer flight suit, flight jacket, LPA-1, SV-2A, M-24 mask, flight boots, fire-retardant gloves, SPH-3B helmet, and bullet bouncer. Optional items not shown are his shoulder holster and his .38 and/or his M-16 automatic rifle or M-79 grenade launcher.

Figures 3 and 4 show close-ups of the pilot all "mounted up." The line in Fig.



Fig. 1



Fig. 2



Fig. 3

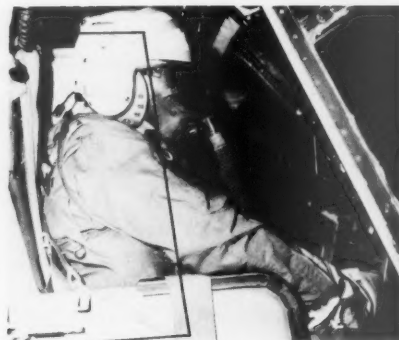


Fig. 4

4 indicates the approximate position of the armored seat wing panel when it is in place.

True, "the very nature of life support equipment makes it uncomfortable and unattractive from the start," and, although we may have made "significant improvements" in equipment design, our overall man-equipment-machine interface lacks almost as much now as in 1920.

CAPT W. J. Nerbun, USMC
HMM-264 ASO



APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

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Sexy, Not Funny

MCAS Anywhere – I just finished the March issue and found it interesting, but again something seems to be missing. We, meaning you mostly, have lost a sense of humor. The issue provoked no guffaws, laughter, or chuckles – not even a smile. Even Anymouse was deadly serious. I'll grant you that aviation is a serious business, but can't we laugh at ourselves and some of our not-so-tragic difficulties?

Dilbert is apparently dead and buried. I haven't seen a *Sense* pamphlet in years. Wha' happen? No more funny mistakes? Isn't there a need for a few chuckles while learning? I guess not. Must we really take the whole thing so seriously and leave no room for a laugh?

Two recent articles come to mind as especially deserving; "And Then There Were None" (it was so incredible I laughed in amazement) and "Grow Old With Me" (outstanding). 'Nuff said. I haven't seen an article for years that compares to either, yet, I know incidents to base them on still happen.

I thought the best written article, and the one that comes close to the old days, was "Reflections on Mortality" (MAR '74 APPROACH). I've seen myself quit smoking as often as three times a day. I agree that smoking is bad. My flight surgeon agrees. Why doesn't the Exchange Officer or Club Officer agree? Cigarettes are one of the most heavily discounted items of merchandise offered in either place.

The loss of our sense of humor is keenly felt. RIP Dilbert.

Name withheld, USMC

P.S. That's a nice looking lady on the

TIPS For The Helicopter Passenger



back cover. If you can't be funny, be sexy.

• The demise of Dilbert's *Sense* pamphlets came as a result of budget cuts in the early '60s. One of the last was *NATOPS Sense* printed in 1963. Nevertheless, there is a new pamphlet in the works (see insert).

Pilots still make funny mistakes, but all of 'em cost so much today, nobody's laughing. Apparently we've gone for a more sophisticated method of preventing pilot errors.

APPROACH will look for more levity in the future.

"After all, there's nothing wrong with a little humor now and then, just as long as it's not funny."

Fuel Management Switch

FPO, New York – The article concerning the crossfeed switch (AUG '73 APPROACH) caught my attention.

As an SH-3 pilot, I know that closing either No. 1 or No. 2 firewall valve, vice the crossfeed switch, can be hairy if not noticed and corrected immediately. I also feel that rotating the switch 90 degrees won't eliminate the problem. How would you then distinguish between open and closed?

With a right/left switch, you'll still have to read the words on the fuel management panel to see which way you have actuated the switch. If this is the case, then the present switch is satisfactory – all you have to do is read those little words.

An alternate solution, and a better proposal to the dilemma, is to change the shape of the switch and make it similar to one of the ASE control panel knobs. You could also put a protective cover on the switch – similar to the hoist guillotine switches. This way, you've introduced something foreign to the fuel management panel, and it is highly unlikely anyone would mistake this unique switch for a firewall shutoff valve.

Our squadron SOP is to have both pilots sight and agree on which switch will be opened or closed on the fuel management panel before the left-seat pilot moves any of the fuel switches.

LT W. C. McCamy
HS-5 NATOPS

• We like your squadron SOP better than fooling with switch design.

PPR/OBO

MCAS East – Would someone please tell me why in the blankety-blank NAS Pensacola is "Prior Permission Required/Official Business Only?" Does a Yale grad have to call the Dean and request permission to revisit the campus? Of course not. So, whatever the problem, let's correct it and open up NPA.

MAJ Marine

• APPROACH tends to share your sentiments, however, here's the official version:

NPA is PPR only after 1630 on weekdays and all day on weekends. No, it's not fuel problems – but personnel shortages. Like so many activities today, they've had to cut back some of their services 'cause there's just not enough bodies to tote the load 24 hours a day anymore. ◀

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approach/may 1974



A Seasprite for Davy

This is a good shot; sharp and with good definition. But, look at the violations: the crewman isn't strapped in; more than one gent has his sleeves pushed back; and the pilot's visor is up. Looking at the picture, one wouldn't realize that this nice, shiny helicopter is seconds from a crash.

Here, No. 1 engine is burning and turning, but No. 2 looks cold. Auxiliary tanks have been jettisoned (splash). But, why is the gear down?

It's pretty obvious the helo couldn't stay airborne. (Check the big bite on those rotor blades.) Now, if it will just float, maybe it can be salvaged and we'll find out what the problem was.



She's all yours, Davy.



Operator No. 1: He wants what?

Operator No. 2: He wants a run of all blue-eyed, fixed-wing pilots, between 25-40 years old, who have screwed up an approach, in night instrument conditions, at civilian or Air Force airports, between 2100-0400, for the past 5 fiscal years. Oh, get a reading of fatalities and serious injuries, too.

To find out what will compute,
see the article beginning on page 18.

